CLAIMS

1. Method for determining an effort transmitted between the wheel of a vehicle and a wheel support, the said method comprising the steps consisting of:
mounting the said wheel (36) pivotably on a wheel support (27), the said wheel being provided with a tyre;
pressing the said tyre against an excitation means (29);
measuring a fixed support effort (F'^{SF}) which is transmitted between the said wheel and the said wheel support when the said tyre is excited with the said excitation means, the said wheel support (27) being fixed in at least one direction (X,Y,Z) in relation to the said excitation means, characterised by the step consisting in calculating (37), on the basis of the said fixed support effort, a suspended support effort (F'^{SS}) which would be transmitted between the said wheel and a wheel support (30) having a degree of freedom of suspension in at least one said direction in relation to the said excitation means.

2. Method according to claim 1, characterised in that the said suspended support effort is calculated on the basis of the non-suspended mass of a ground contact system which includes the tyre-wheel assembly (36) and a wheel support which is connected to a suspension device (30).

3. Method according to claim 2, characterised in that the said suspended support effort is calculated on the

basis of a resonance frequency and/or a shock-absorption coefficient which are characteristic of a specific mode of the said ground contact system.

4. Method according to claim 2 or claim 3, characterised in that the said suspended support effort is calculated on the basis of a rigidity and/or a shock-absorption of the said suspension device (30).

5. Method according to any one of claims 1 to 4, characterised in that the suspended support effort is calculated on the basis of a rigidity and/or a shock-absorption of the said tyre (2).

6. Method according to any one of claims 1 to 5, characterised in that the said suspended support effort is calculated on the basis of a resonance frequency and/or an absorption coefficient which are characteristic of a specific mode of the said tyre (2).

7. Method according to claim 6, characterised in that the said suspended support effort is also calculated on the basis of a parameter of coupling between the said specific mode of the tyre and a displacement of the wheel centre.

8. Method according to any one of claims 1 to 7 characterised in that the said suspended force effort (F'^{SS}) is calculated in the frequential domain by multiplying the said fixed support effort (F'^{SF}) by a passage matrix (H_p).

9. Method according to claim 8, characterised in that the said passage matrix (H_p) is diagonal when the said efforts are expressed in a reference corresponding to the main directions (X,Y,Z) of the vehicle (25).

10. Method according to claim 9, characterised in that at least one diagonal coefficient of the said passage matrix has development which decreases globally (18, 19) above a certain frequency.

11. Method according to claim 9 or claim 10, characterised in that at least one diagonal coefficient of the passage matrix has a peak (14, 15) at the level of a resonance frequency of the ground contact system.

12. Method according to any one of claims 9 to 11, characterised in that at least one diagonal coefficient of the said passage matrix has, on a portion of the spectrum, an adjacent minimum and maximum (16, 17) which represent frequential offsetting of a specific mode of the tyre.

13. Use of the method according to any one of claims 1 to 12 in order to determine a transfer function of a vehicle (25) equipped with a ground contact system which includes a wheel support connected to a body (33) by means of a suspension device (30) and a reference tyre-wheel assembly (26) which is fitted on the said wheel support, characterised by the steps consisting of:
measuring a level of noise and/or vibration (40) inside the vehicle when the tyre of the said reference

tyre-wheel assembly is excited in specific rolling conditions;

implementing (31) the method according to any one of claims 1 to 12 with the said reference tyre-wheel assembly (26) excited in the said rolling conditions which are determined such as to calculate the said suspended support effort (F^{SS}) as effort transmitted between the said reference tyre-wheel assembly and the said wheel support of the ground contact system;

determining the said transfer function (34) in the frequential domain (32) between the said level of noise and/or vibration (40) measured and the said effort calculated (F^{SS}).

14. Use of the method according to any one of claims 1 to 12 in order to predict the comfort performance of a vehicle (25) to be equipped with a ground contact system which includes a wheel support connected to a body by means of a suspension device (30) and a prototype tyre-wheel assembly (36) which is fitted on the said wheel support, characterised by the steps consisting of:

implementing (37) the method according to any one of claims 1 to 12 with the said prototype tyre-wheel assembly (36) in order to calculate the said suspended support effort (F^{SS}) as effort transmitted between the said prototype tyre-wheel assembly and the said wheel support of the ground contact system; and

multiplying (38) the said effort calculated by a transfer function (34) of the said vehicle in the frequential domain in order to obtain a level of

noise and/or vibration (41) foreseen in the interior of the vehicle.

15. Use according to claim 14, characterised in that the said transfer function (34) is determined by use according to claim 13.

16. Data processing device, characterised in that it comprises an interface to enter a fixed support effort signal (F^{SF},F'^{SF}) representing an effort transmitted between a wheel support (27) which is fixed in at least one direction relative to an excitation means (28, 29) and a vehicle wheel (26, 36) which is fitted pivotably on the said wheel support and is provided with a tyre which is pressed against the said excitation means, and calculation means which are programmed to implement a functional suspension model which, on the basis of the said fixed support effort signal, can calculate a suspended support effort signal (F^{SS},F'^{SS}) representing an effort which would be transmitted between the said wheel (26, 36) and a wheel support (30) having a degree of freedom of suspension in at least one said direction relative to the said excitation means.

17. Computer programme comprising instruction codes which can be read or stored on a support and can be executed by a computer in order to implement a functional suspension model which, on the basis of a fixed support effort signal (F^{SF},F'^{SF}) representing an effort transmitted between a fixed wheel support (27) in at least one direction relative to an excitation

means (28, 29) and a vehicle wheel (26, 36) which is fitted pivotably on the said wheel support and is provided with a tyre which is pressed against the said excitation means, can calculate a suspended support effort signal (F^{SS},F'^{SS}) representing an effort which would be transmitted between the said wheel (26, 36) and a wheel support (30) having a degree of freedom of suspension in at least one said direction relative to the said excitation means.